Altruism begets altruism:
Nudging our way to a more virtuous society?[*]

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November 24, 2019

ABSTRACT: Economic research examining social preferences over the past several decades has increasingly focused on better understanding and teasing apart distinct motives. While the research has primarily focused on short term behavior, this paper goes beyond this literature to better understand how a short-term intervention, a nudge, can affect subsequent behavior. Using a popular policy nudge, the default option, we show that its effect on the *choice* to be more altruistic "today" causes an increase in altruism "tomorrow". We rule out that the nudge has a direct inter-temporal effect and instead build upon self-perception theory to show that our findings are consistent with a model of habit persistence and moral consistency; that is, altruism begets altruism. Our local average treatment effect indicates that the nudge-induced giving in Round 1 of the experiment causes a 40 percentage point (or 200%) increase in the propensity to give in Round 2. Our findings suggest a way forward in promoting a more virtuous society.

1 Introduction

Policy shapes society by encouraging socially desirable behavior. For example, in the United States, the government successfully incentivizes charitable giving by allowing individuals to deduct donations from their pre-taxed income. This policy can also have additional and often unaccounted for consequences: decreases in the after-tax price of giving increase charitable giving and are also associated with increases in other socially desirable behaviors, such as volunteerism (Feldman, 2010) and health (Yörük, 2014).[1][2]

A large body of research has also examined the factors that increase charitable giving, including the effects of price (Karlan and List, 2007), efficiency concerns (Gneezy, Keenan, and Gneezy, 2014; Exley, 2015b), social pressure (List and Lucking-Reiley, 2002; Frey and Meier, 2004; Shang and Croson, 2009), and identity (Kessler and Milkman, 2016), however, there is far less research on the inter-temporal effects of these interventions. An intervention may affect future behavior through two channels: (1) the nudge "today" may have a direct inter-temporal effect on behavior "tomorrow" (Meier, 2007; Shang and Croson, 2009; Cairns and Slonim, 2011; Gneezy et al., 2012; Castillo, Petrie, and Samek, 2017); and (2) the nudge "today" effects behavior "today" which then effects behavior "tomorrow".

In this paper, we hypothesize and show that altruism begets altruism;[3] that is, a nudge-induced increase in charitable giving today *causes* an increase in future charitable giving.[4] This is distinct from previous literature that shows a positive correlation in giving over time (Landry et al., 2010; Adena and Huck,

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[1]Cappelen et al. (2017) also, find evidence of "unaccounted" for effects. In a large field experiment, they find that incentivizing subjects to go to the gym increases the likelihood of exercise, which in turn, increases the subjects' academic performance.

[2]Policies can also be used to discourage undesirable behavior. For example, in the United States, the government discourages teenagers from drinking alcohol by placing a minimum age on alcohol consumption. Although this has decreased teen-drinking, it is also associated with an increase in teens' use of marijuana (DiNardo and Lemieux, 2001).

[3]Our initial hypothesis is supported by the review in Gee and Meer (2019), who conclude that while there is some evidence of donor fatigue (Damgaard and Gravert, 2018), "the preponderance of evidence finds that gifts today do not cannibalize gifts tomorrow."

[4]See Thaler and Sunstein (2003) and Sunstein and Thaler (2008) for a review of nudges.

2019) and instead provides causal evidence of the effect of altruistic choices today on altruism tomorrow.

We further hypothesize that identity drives the causal relationship between charitable giving over time, contributing to the growing literature on the role of identity in economics (Akerlof and Kranton, 2005) and, more specifically, in charitable giving (Benjamin, Choi, and Fisher, 2010; Kessler and Milkman, 2016). Bem (1972)'s self-perception theory provides a framework for considering how identity might link altruism inter-temporally. Self-perception theory posits that individuals use past behavior and choices to make inferences about their own identity, which then inform future choices. Bénabou and Tirole (2011) formalize self-perception theory in economics and model individuals with imperfect memories of their identity but use their past choices to make inferences about their identity. This inference about their identity then provides a guide for current choices. Thus, self-perception theory predicts a path-dependency between moral actions over time.

Motivated by the history-dependence in actions modelled by Bénabou and Tirole (2011), we model our decision-maker's utility at time t as dependent on his current choice of charitable giving and his $t-1$ choice of altruism using a habit formation model (Pollak, 1970). Further, his $t-1$ choice depends on his previous choices of altruism as well as on whether he is nudged towards altruism or selfishness at $t-1$. We thus model moral consistency in altruism as habit persistence charitable giving, meaning that charitable giving is not just positively correlated over time, but that an increase in past giving *causes* an increase in giving today (Meer, 2013).

Further, we incorporate identity into our model through past choices of altruism—the more the charitable donations an individual has given in the past, the more likely he is to strongly identify as altruistic. Our model also predicts that if altruism begets altruism, then this will be driven by individuals for whom altruism is a weak facet of their identity. This is consistent with Benabou and Tirole's (2011) model, where individuals for whom altruism is a weakly held facet of their identity are predicted to behave in a more morally consistent manner. On the other hand, Benabou and Tirole's (2011) model of

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self-perception theory also predicts that effective challenges to strongly-held aspects of identity "today" are met with contradictory responses "tomorrow". Thus, depending on whether an individual has a weakly or strongly held conviction towards altruism, Bénabou and Tirole (2011) predicts either moral consistency (Nisan, 1985; Nisan and Horenczyk, 1990) or moral licensing (Khan and Dhar, 2006; Monin and Miller, 2001; Ploner and Regner, 2013; Sachdeva, Iliev, and Medin, 2009) (also see Blanken, van de Ven, and Zeelenberg (2015) and Mullen and Monin (2016) for a review of this literature).

To examine whether altruism begets altruism, we ran an online experiment in which we nudged individuals to either donate to charity or to keep the money for themselves by setting their default option to "donate" or to "keep", respectively. Conceptually, setting a default option works "today" by decreasing the marginal psychological costs of choosing the desired behavior. Setting a default to nudge behavior has been found to successfully change the "today" decision in several contexts, such as how much to save for retirement (Benartzi and Thaler, 2007; Choi et al., 2003; Cronqvist and Thaler, 2004; Madrian and Shea, 2001) and joining an organ donor list (Kessler and Roth, 2012, 2014). To avoid donating, subjects in the Default Charity condition must opt-out of giving to charity; by contrast, subjects in the Default Cash condition must opt-in to giving to charity and opt-out of keeping cash (Round 1). Consistent with past research on default option nudges we find that our nudge positively impacts charitable giving behavior (Benartzi and Thaler, 2007; Choi et al., 2003; Cronqvist and Thaler, 2004; Madrian and Shea, 2001; Kessler and Roth, 2012, 2014). Specifically, we find that subjects in the Default Charity condition are twice as likely to donate in Round 1 than subjects in the Default Cash condition.

The novel and critical part of the design is that at a later point in the experiment we ask subjects to make another donation to test whether initial altruistic behavior increases altruism in the future (Round 2). Directly motivated by our model and experimental design, we estimate a local average treatment effect and find that the nudge-induced increase in giving in Round 1 causes giving in Round 2 to increase by 200% or 40 percentage points. We

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also find that the nudge itself has no direct inter-temporal effect on giving in Round 2. Overall, our experiment shows that the nudge-induced altruism in Round 1 begets more altruism in Round 2,[5] thus generating a virtuous cycle of altruism.

In addition and consistent with both our model and Benabou and Tirole's (2011) model, individuals for whom altruism is a weakly held facet of their identity behave in a significantly more morally consistent manner. For these individuals, behaving altruistically in Round 1 causes an 83 percentage point (or 492%) increase in altruism in Round 2. Interestingly, we find that the Default Charity treatment does not differentially affect donation rates in Round 1 between subjects for whom altruism is a weak value and those for whom it is a strong facet of identity. Thus, we cannot attribute the differences in moral consistency between weak and strong identities to differences that stem from behavior in the first stage. However, self-perception theory offers a possible explanation; self-perception theory suggests that the altruistic behavior induced by the nudge is more informative for weak altruists than for strong altruists. Strong altruists have a richer history of donation behavior to draw from when making inferences about their identity to inform their Round 2 decision. On the other hand, weak altruists have a much sparser history that will make the Round 1 decision salient and easily recalled.

To support the validity of our identification strategy and to better understand the role of choice in driving moral consistency, we ran additional treatments in which we randomly assigned subjects to a default position in Round 1, but do not give them the choice to opt-out of their default position; that is, they are forced to make a donation or are forced to keep the money in Round 1 (henceforth: No Choice Treatments). Importantly, we find that Default Charity (No Choice) and Default Cash (No Choice) donate at equal rates in Round 2, ruling out the possibility that the nudge has a direct inter-temporal effect, and thus providing further support that it is the choice to

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[5]In fact, this finding is similar to the exclusion restriction assumption needed to estimate a local average treatment effect using instrumental variables (Angrist, Imbens, and Rubin, 1996)

act altruistically, induced by our nudge, that causes the increase in altruism in Round 2.[6] These additional treatments provide some evidence that the exclusion assumption for instrumental variables holds, providing support for the validity of our IV estimate.

Our contribution is thus twofold. First, we provide very strong evidence in favor of moral consistency; that is, we show that altruistic choices at $t - 1$ causes an increase in altruism at t. To claim this causal relationship, we show that the exclusion restriction assumption holds and that the nudge itself is not responsible for the direct inter-temporal effect, but rather the choice to act altruistically that the nudge induces at $t - 1$ causes the increase at t. Therein lies our second contribution—using experimental treatments to directly test that the theoretical assumptions behind our empirical test hold.

2 Experimental Design, Data & Hypotheses

In this section, we describe our experimental design and the data generated by the experiment. We also present a model of consumption choice, which motivates two competing hypotheses which we test in section 3.

2.1 Calibrating Preferences

We ran a pre-experimental calibration exercise to gauge the amount that must be donated to the chosen charity for the average subject to be indifferent to giving up $1. The calibration exercise is important to set the default options such that some subjects will prefer to donate, while other subjects will prefer to keep cash for themselves. By finding a the median point of indifference

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[6]Gneezy et al. (2012) reports results from an experiment in which subjects who are randomly assigned to make a costly donation are more likely to behave honestly in a subsequent period than subjects who are randomly assigned to make a costless donation. Importantly, particularly in relation to our study, subjects in both the costly and costless treatment were forced to donate rather than having to choose whether to behave altruistically. Thus, while a direct impact through salience is possible, Gneezy et al. (2012) prevents an indirect channel predicted by self-perception theory that we will explore here.

between donating to charity and keeping cash for self, we can be confident that the nudge towards charity or the nudge towards keeping cash will be on the appropriate margins.

To do the calibration, we used the same charity, CARE, that we will use in the Round 1 decision of the experiment. This exercise follows the calibration exercise in Exley (2015a) and presents subjects with a multiple price list. On each line, they are asked whether they prefer to keep a $1 and give $0 to the charity or keep $0 and give $x to the charity, where x$\in \{$0, $0.1, ...$3\}$. While Exley (2015a) uses a within-subject calibration, our calibration is taken as the median point of indifference across subjects, which was $1 to self was utility-equivalent to $1.50 to charity. This is how we chose the values in Round 1: subjects in the Default Cash condition were endowed with $1 to keep for themselves and subjects in the Default Charity condition were endowed with making a $1.50 donation to the charity. Subjects in this calibration exercise were excluded from participating in any of the experimental conditions that follow.

2.2 Main Treatments

The main experiment consists of two Rounds. In Round 1, subjects were randomly endowed with $1 cash (Default Cash condition) or endowed with a $1.50 donation to the charity CARE (Default Charity condition). Figures A1a and A1b display what the subjects saw if they were assigned to the Default Cash and Default Charity treatments, respectively. After providing their endowment, we took two additional steps to facilitate a sense of ownership among subjects of their default position. First, we asked subjects in the Default Charity condition to list three ways the charity CARE might spend this money and we asked subjects in the Default Cash condition to list three ways they might spend their cash endowment. Second, we asked subjects to complete a set of unrelated filler questions. These filler questions created a period over which the subject had ownership of their default position (Strahilevitz and Loewenstein, 1998). Having subjects write about their endowment is a common technique

in the psychology literature to increase the sense of ownership (Shu and Peck, 2011) and elongating the time of having ownership of one's endowment has been shown to increase the endowment effect (Strahilevitz and Loewenstein, 1998). Moreover, while completing the filler questions,[7] we reminded subjects of their default position by showing an image of their endowment to further reinforce the ownership of the default option they were given.

After completing the filler tasks, we asked subjects whether they would like to swap their position. Subjects assigned to the Default Cash treatment were asked if they wanted to give back their $1 to make a $1.50 donation to CARE while subjects assigned to the default donation treatment were asked if they wanted to not make the $1.50 donation to get $1 in cash. Figures A1c and A1d display the decisions faced by the subjects from the Default Cash and Default Charity treatments, respectively. When subjects made their Round 1 choice, they were unaware that there would be a Round 2 choice and we expect that their choices in Round 1 may have differed if they anticipated a Round 2 donation solicitation (Adena and Huck, 2019).

Next, we presented subjects with a multiple price list in which they had to choose one of 11 options. For each item, they could choose to add $X= $(0, 0.10, 0.20...1.00)$ to their bonus and donate $2×(1-X) to Save the Children (see Table A1). For example, in the first option, subjects could choose to add $1 to their bonus and donate $0 to Save the Children, while in the last option, subjects could choose to add $0 to their bonus and donate $2 to Save the Children. Subjects had to make one choice from the list.We chose a new charity for the Round 2 decision to avoid a potential charity-specific wealth effect; that is, if some subjects donated to CARE in Round 1 (and others did not), then the marginal utilities of donating to CARE in Round 2 could differ by treatment assignment.

After completing the two rounds of decisions, we asked a brief series of demographic questions as well as questions about their past charitable giving behavior. We summarize and discuss these statistics below in Table 1.

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[7]Please see the full experimental protocol here to see the filler tasks the subjects performed.

2.2.1 Additional Treatments

In addition to the two main treatments, we included three additional treatments. In our first and second control treatments, the No Choice Treatments, subjects are assigned to either the Default Charity or Default Cash conditions, they then complete filler tasks and are then asked to make the same Round 2 donation decision as the Choice treatments. The main difference between these No Choice treatments and the Choice treatments is that subjects in the No Choice treatments are not given the opportunity to switch their Round 1 default position. Thus, subjects in the Default Charity (No Choice) treatment are forced to make a donation in Round 1, while subjects in the Default Cash (No Choice) treatment are forced to keep the cash in Round 1. For robustness, we ran three variations of the No Choice treatments: (1) the No Choice-No Info treatments where subjects are unaware of the opportunity or presence of an alternative position; (2) the Hypothetical Scenario treatments where subjects are asked to consider the hypothetical scenario of having a choice to opt-out of their default position; and (3) Hypothetical Choice treatments where subjects are asked to make a *hypothetical* choice to either remain in the default position or opt-out. We ran each of the variations because we wanted to rule out that being aware of the alternative position, rather than an active choice, was the difference between the No Choice treatments and the Choice treatments. We find no significant differences across these three variations and thus, in what follows, these three variations are pooled together under the No Choice treatments.

In sum, all subjects in the Default Charity (No Choice) condition will donate, and thus, importantly, they have no *active choice* to do so. Thus, comparing the Default Charity (Choice) condition to the Default Charity (No Choice) condition, tests the critical prediction of self-perception theory for our main hypotheses. Specifically, self-perception theory argues that an active choice is an important component linking behavior and identity, noting that rejected alternatives reinforce the inferences an individual can make from their choice about their identity (Bem, 1972; Zanna, 1972). For example, an individ-

ual learns less about his altruistic identity if he is forced to donate rather than having had an active choice to keep the money for himself. In other words, the psychological cost associated with the donation in Round 1 is greater when the subject has the opportunity to keep the money than when he is forced to make a donation. The purpose of the No Choice-No Info treatments is thus to examine whether it is the *choice* of altruism in Round 1 that begets altruism in Round 2, rather than the nudge itself. This is critical for the interpretation of the results and also for arguing that the exclusion restriction holds, which is necessary to estimate a local average treatment effect.

In our third control treatment (henceforth: Round 2 Only), subjects do not make a Round 1 decision and instead begin the experiment with the filler tasks and are then asked to make a Round 2 donation decision that is identical to the original treatments. The purpose of the Round 2 Only treatment is twofold. First, if we find a difference between the Default Charity and Default Cash, we can compare Round 2 behavior in these treatments to the behavior of subjects in the Round 2 Only condition to see which of those treatments are more similar to the Round 2 Only treatment. If one of the default treatments is closer to the Round 2 Only behavior, then this will tells that the other default treatment was the treatment that had the bigger impact on Round 2 choices. Second and related, we can examine whether subjects who have the opportunity to give twice (i.e., subjects in the Default Charity and Default Cash) make more total donations than subjects who are only asked to give once (i.e., Round 2 Only); that is, we can examine whether the second ask does not crowd-out donations.

2.3 Data

The data from our experiment come from Amazon's Mechanical Turk (Mturk) and was completed by 1801 Mturk workers from the United States who have HIT approval rate greater than 99% and have had more than 10000 HITs approved. Table 1 displays the summary statistics for the subjects in our experiment. Approximately half of the subjects are female, the majority work

full-time and 77% have donated to charity at least once in the last year.

To determine subject's conviction towards altruism, we asked them whether they had donated money to a charity 0, 1, 2, 3 or 4 or more times in the past year (not including the donation made during the experiment). On average, subjects donated 2.3 times in the past 12 months. Using this variable, we classify subjects as having a strong conviction towards altruism if they indicated that they have given 4 or more times in the past year.

TABLE 1: SUMMARY STATISTICS

	All	Default Charity (Choice)	Default Cash (Choice)	Default Charity (No Choice)	Default Cash (No Choice)	Rou O
No. of Donations in Past Year	2.24 (1.61)	2.49 (1.62)	2.15 (1.66)	2.14 (1.62)	2.40 (1.63)	2. (1
Altruism Strongly Held Value Past donations ≥ 4	.32 (.47)	.38 (.49)	.31 (.46)	.26 (.44)	.34 (.47)	. (.
Female	.52 (.50)	.52 (.50)	.54 (.50)	.51 (.50)	.52 (.50)	. (.
Age	37.91 (12.52)	40.51 (11.82)	38.38 (11.56)	37.46 (14.31)	37.22 (11.63)	38 (11
Unemployed	.07 (.26)	.05 (.22)	.09 (.29)	.09 (.28)	.06 (.24)	. (.
Employed full-time	.63 (.48)	.64 (.48)	.58 (.49)	.64 (.48)	.64 (.48)	. (.
Employed part-time	.16 (.36)	.14 (.35)	.18 (.38)	.14 (.35)	.17 (.35)	. (.
Retired	.03 (.18)	.05 (.21)	.04 (.20)	.03 (.18)	.03 (.16)	. (.
Income < $10,000	.05 (.21)	.07 (.25)	.05 (.23)	.05 (.21)	.04 (.19)	. (.
Income > $150,000	.04 (.19)	.04 (.19)	.02 (.15)	.04 (.19)	.04 (.19)	. (.
Observations	1801	191	224	557	630	1

Means reported with standard deviations in parentheses.

2.4 Model, Hypotheses and Empirical Strategy

Next, we turn to modeling the choice to donate at t, given previous donation choices, and the main question of our paper: does altruism beget altruism?

To formalize this question, we consider an individual who has preferences over two goods at time t, private consumption (c_t) and charitable giving (A_t). The individual's preferences can be represented by a utility function with the following form,

$$U(c, A) = u(c_t, c_{t-1}(\Theta_c)) + \alpha v(A_t, A_{t-1}(\Theta_A)) \qquad (1)$$

where Θ_c and Θ_A represent a composite of private consumption and charitable giving up to and including time $t - 2$, respectively. Thus, today's utility depends on the choices the individual makes today as well as all past choices. The parameter $\alpha \in [0, 1]$ governs the intensity of the individual's preference for altruism and warm glow. The functions $u(\cdot)$ and $v(\cdot)$ are concave in consumption and donations to charity, respectively. A subject solves the following equation at time t

$$\max_{c_t, A_t} U(c_t, A_t \mid \bar{c}, \bar{A}) = \max_{c_t, A_t} u(c_t - \gamma_c c_{t-1}(\Theta_c)) + \alpha v(A_t - \gamma_A A_{t-1}(\Theta_A)) \text{ subject to } I = c_t + p \times A_t \qquad (2)$$

where the parameter γ_c and $\gamma_A \in \mathbb{R}$ represent the intensity of the past consumption $(c_{t-1}(\Theta_c), A_{t-1}(\Theta_A))$ on today's utility and will pin down whether there are negative, positive or no spillovers. I is income and p is the relative price of making a donation. We want to compare the optimal choices at time t of individuals nudged towards altruism versus subjects nudged towards selfishness at time $t - 1$. Let $A_t(Z)$ and $A_{t-1}(\Theta_A, Z)$ represent the choices at t and $t - 1$, respectively, for an individual who receives nudge $Z \in 0, 1$, where $Z = 1$ indicates the subject was nudged towards altruism and $Z = 0$ indicates the individual was nudged towards selfishness. From the first order conditions we find that

$$A_t(Z = 0) - \gamma_A A_{t-1}(\Theta_A, Z = 0) = A_t(Z = 1) - \gamma_A A_{t-1}(\Theta_A, Z = 1) \qquad (3)$$

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We assume that $\frac{\partial A_{t-1}}{\partial \Theta_A}|_{Z=1} \geq \frac{\partial A_{t-1}}{\partial \Theta_A}|_{Z=0}$. Rearranging and taking expectations of equation 3, we obtain

$$\frac{E\left[A_t \mid Z=1\right] - E\left[A_t \mid Z=0\right]}{E\left[A_{t-1} \mid \Theta_A, Z=1\right] - E\left[A_{t-1} \mid \Theta_A, Z=0\right]} = \gamma_A \qquad (4)$$

The left-hand-side of equation 4 is the equation for an instrumental variable estimand, β^{IV}. Thus, we propose to test for positive or negative spillovers by estimating the local average treatment effect (Imbens and Angrist, 1994)using instrumental variables (Angrist, Imbens, and Rubin, 1996).

Our identification strategy relies on three assumptions. First, the instrument, Z, is randomly assigned. We satisfy this assumption in our experimental design. Second, the effect of the instrument, Z, must be monotonic in that a subject in the Default Charity condition must be at least as likely to donate in Round 1 than he would have been had he been assigned to the Default Cash condition. The monotonicity assumption is related to the denominator of equation 4, which is the first stage of our IV estimate. Thus, we hypothesize that, on average, subjects in the Default Charity condition will be more likely to donate in Round 1 then subjects in the Default Cash condition; that is, $E\left[A_{t-1} \mid \Theta_A, Z=1\right] - E\left[A_{t-1} \mid \Theta_A, Z=0\right] > 0$. We test and provide support for this hypothesis in Section 3.1

Hypothesis 1. *Default Option Hypothesis: Participants who are defaulted into making a donation are more likely to donate in Round 1 than participants who are defaulted into keeping cash.*

Third, the exclusion restriction states that the instrument only affects outcome A_t through A_{t-1} (i.e., Round 1 donation behavior) and does not directly affect outcomes, A_t. Given our research question and experimental design, this assumption is the hardest to justify without some evidence. However, in our No Choice treatments described in Section 2.2.1, we remove the *choice* Round 1 and instead force subjects to either donate or keep the cash in Round. If there are no treatment differences in Round 2 behavior when there is no active choice in Round 1 (i.e., the No Choice treatments), then we take this as

evidence that any differences in Round 2 when there is an active choice (i.e., the Choice treatments) can be attributed to the treatment-induced change in behavior in Round 1 rather than solely to the treatment itself. This suggests that it is the choice of donating in Round 1, which is influenced by the subject's default position, rather than the nudge (i.e., the instrument, Z) that affects Round 2 donation decisions (i.e., outcomes, A_t). We test and provide support for this hypothesis in Section 3.2

Hypothesis 2. *Exclusion Restriction Hypothesis: The default option treatment Z does not directly affect the decision to donate in Round 2. Instead, any effect of Z on Round 2 donation choices operates solely through the choice to donate in Round 1.*

Finally, we turn to the main hypotheses about the direction of the behavioral spillovers and the role for identity. Positive behavioral spillovers imply that $E[A_t \mid Z = 1] - E[A_t \mid Z = 0] > 0$ and therefore, given Assumption 1, $\gamma_A > 0$. We interpret a positive behavioral spill-over as moral consistency since $\gamma_A > 0$ implies that the Default Charity condition exogenously increases altruism in Round 1 and that this nudge-induced increase in altruism in Round 1 causes an increase in altruism in Round 2.

Hypothesis 3. *Moral Consistency Hypothesis: $\beta^{IV} > 0$, implying that $\gamma_A > 0$ which means that an increased propensity to donate in Round 1 will:*
(i) increase the propensity to donate in Round 2;
(ii) increase the amount donated in Round 2.

Conversely, if $\beta^{IV} < 0$ then $\gamma_A < 0$ which means the nudge-induced altruism in Round 1 causes a decrease in altruism in Round 2. We interpret this as evidence consistent with moral licensing.[8]

To econometrically analyze the experimental data, we estimate a two-stage least squares regression, where we first estimate the effect of the treatment as-

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[8]**Moral Licensing and Negative Spill-over Hypothesis**: $\beta^{IV} < 0$, implying that $\gamma_A < 0$ which means that an increased propensity to donate in Round 1 will:
(i) decrease the propensity to donate in Round 2;
(ii) decrease the amount donated in Round 2.

signment, Z_i, on Round 1 donation behavior, $A_{i,t-1}$. We then use the predicted values of Round 1 donation behavior, $\widehat{A_{i,t-1}}$, to estimate the second stage to obtain the causal effect of donating in Round 1 on donating in Round 2, Y_i. The interpretation of the coefficient, β^{IV}, is the change in Round 2 donation rates that are caused by the *treatment-induced* donation behavior in Round 1.

$$A_{i,t} = \beta_0 + \beta^{IV}\widehat{A_{i,t-1}} + \varepsilon_i, \tag{5}$$

We then examine how identity affects the causal relationship between altruism at t and $t-1$. We draw from self-perception theory and posit that identity is inferred from past choices. Thus, the composite of past charitable giving, Θ_A, serves as a proxy for the facet of identity related to altruism.

Weak Identity Towards Altruism   Benabou & Tirole's (2011) model, also drawing heavily from self-perception theory, predicts that when weakly-held values are encouraged, individuals respond in a confirmatory way (i.e., morally consistent), as the value becomes more salient to the individual. In other words, as stated in Hypothesis 4, individuals for whom altruism is a weak facet of their identity will behave in a morally consistent way in the future, when nudged towards altruism today. Thus, the predictions from our model and the Bénabou and Tirole (2011) model about individuals with weak identities towards altruism are similar when $\gamma_A > 0$.

In our model, it is straightforward to show that if $\gamma_A > 0$, then γ_A is *decreasing* in the strength of the individual's altruistic identity (Θ_A). Thus, Hypothesis 5 states that the magnitude of the local average treatment effect will be greater for those with a weak identity than for those with a strong identity towards altruism.

Strong Identity Towards Altruism   By contrast, Bénabou and Tirole (2011) predict that when strongly-held convictions are challenged, individuals will be more likely to respond in a contradictory way to the challenge to restore their self-image. This means that for those individuals who have a

strong identity towards altruism but are nudged towards selfishness (i.e., the Default Cash condition), Bénabou and Tirole (2011) predicts that individuals will respond by being more altruistic in the future. We formally state this in Hypothesis 6.

To test these hypotheses, we will use a similar specification from equation 5. One change is that we will interact our endogenous regressor (A_{t-1}) with the strength of conviction towards altruism, either weak ($\Theta_A = 0$) or strong ($\Theta_A = 1$), and instrument for Round 1 donation behavior using the assignment to the Default Charity treatment interacted with the strength of the conviction. Our specification for this hypothesis is therefore given by

$$A_{i,2} = \delta_0 + \delta_1^{IV} \widehat{A_{i,1}} \times \mathbf{1}\left[\Theta_A = 0\right] + \delta_2^{IV} \widehat{A_{i,1}} \times \mathbf{1}\left[\Theta_A = 1\right] + \varepsilon_i, \qquad (6)$$

Similarly, to estimate the causal effect of keeping the money in Round 1 ($c_{i,1}$) on the likelihood of also keeping the money in Round 2 ($c_{i,2}$) we instrument for keeping the money in Round 1 using the assignment to the Default Cash condition. We use a similar interaction as in equation 6.

$$c_{i,2} = \lambda_0 + \lambda_1^{IV} \widehat{c_{i,1}} \times \mathbf{1}\left[\Theta_A = 0\right] + \lambda_2^{IV} \widehat{c_{i,1}} \times \mathbf{1}\left[\Theta_A = 1\right] + \varepsilon_i, \qquad (7)$$

Hypothesis 4. *Altruism as a Weak Facet of Identity I*:
$\delta_1^{IV} > 0$: *individuals who hold altruism as a weak facet of their identity will behave morally consistently.*

Hypothesis 5. *Altruism as a Weak Facet of Identity II*: *if $\gamma_A > 0$, then individuals who hold altruism as a weak facet of their identity will behave more morally consistent than individuals who hold altruism as a strong facet of their identity; that is, $\delta_1^{IV} > \delta_2^{IV}$.*

Hypothesis 6. *Altruism as a Strong Facet of Identity*:
(i) $\lambda_2^{IV} < 0$: individuals who hold altruism as a strongly-held facet of their identity will respond in a contradictory way to a nudge towards selfishness.

3 Results

In this section, we outline our results based on our hypotheses from Section 2.4. Taken together, our set of results is consistent with moral consistency; that is, exogenously-induced altruism in one period causes an increase in altruism in a subsequent period. In other words, altruism begets altruism. To establish our main result, we first demonstrate that we have a strong instrument (result 1) and, importantly, that the exclusion restriction holds (result 2), in Sections 3.1 and 3.2, respectively. We then establish our main result, that altruism begets altruism, result 3, in Section 3.3. For each result, we begin with a statement of the result, followed by the evidence to support it. In Section 3.4, we present additional findings on total giving.

3.1 Round 1 Decisions

Result 1. *Our nudge significantly affects round 1 donation rates. Subjects who are defaulted into giving to charity are significantly more likely to donate in Round 1 than subjects who are defaulted to keep a utility-equivalent amount of cash.*

Figure 1a shows that subjects assigned to the Default Charity treatment are 19 percentage points more likely (more than a 100 percent increase) to donate to charity in Round 1 than subjects assigned to the Default Cash treatment (t-test: p-value<.0001). In Figure 1b we look at the effect of the default option nudge by subjects' number of charitable donations in the past 12 months. In general, we find that the Default Charity condition significantly increases donation rates regardless of the subjects' past donation history. For example, subjects with strongly-held (weakly-held) views towards altruism are 23 (15) percentage points more likely to give under the Default Charity than Default Cash condition (t-test: p-value=.003 and p-value=.002, respectively). Moreover, in a regression framework, we show that the Default Charity nudge increases the propensity to give in Round 1 by 18 percentage points while having a subject with a strong conviction towards altruism, relative to a weak

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FIGURE 1: FIRST-STAGE: ROUND 1 DONATION RATES
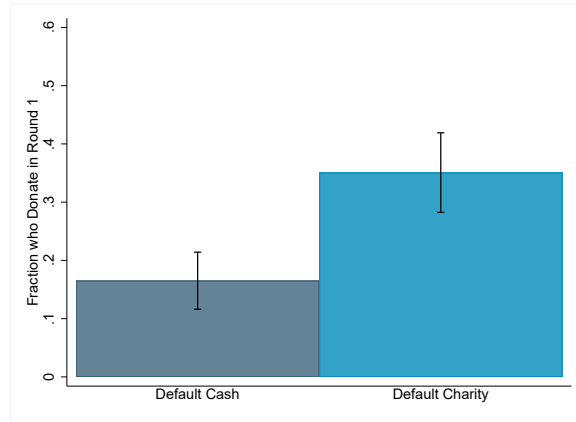
(A) ROUND 1 RATES
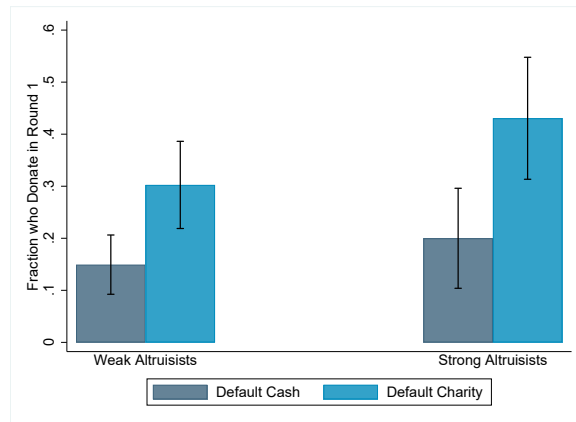
(B) ROUND 1 RATES BY CONVICTIONS

Average donation rates in Round 1 by treatment assignment with 95% confidence intervals.

one, is associated with an 8 percentage point increase in giving in Round 1. The difference between the effect of the nudge and the effect of convictions is not significant (p-value=.15).

3.2 Round 2 Decisions and the Importance of Choice

The purpose of this section, including Table 2, is to provide evidence of the importance of *choice* in Round 1, rather than treatment assignment, in driving

Round 2 choices and the moral consistency that we will discuss in Section 3.3.

Result 2. *We find that the treatment itself has no direct effect on Round 2 choices; that is, subjects in the Default Charity (No Choice) do not behave more altruistically in Round 2 than subjects in the Default Cash (No Choice).*

Table 2 shows that in the No Choice treatments, subjects who (must) give to charity in Round 1 are equally likely to give (column (1)) and give the same amount (column (3)) to charity in Round 2 as subjects who are given cash to keep. Moreover, these results hold regardless of subjects' identity towards altruism.

Further, Table 2 shows that subjects in the No Choice treatments are no more likely to give to charity in Round 2 than subjects who do not participate in Round 1 (i.e., Round 2 only). In other words, when making a choice in Round 2 about giving to a charity, subjects in the No Choice treatments do not take into account that they have either already made a donation or already been given a $1 and instead, on average, make identical choices to those subjects in the Round 2 only treatments. By contrast, there are significant differences in the Choice treatments, depending on what has occurred in Round 1.

3.3 Main Results: Moral Consistency & Identity

Result 3. *Consistent with Hypothesis 3, we find evidence of moral consistency, i.e., $\beta^{IV} > 0$, implying that $\gamma_A < 0$; that is, increased giving in Round 1 increases giving in Round 2. In particular, giving in Round 1 increased the probability of giving in Round 2 by 200% (40 percentage points). Further, giving in Round 1 increases the amount given in Round 2 by $0.59.*

We estimate the effect that the nudge-induced increase in giving in Round 1 has on charitable giving in Round 2 using the instrumental variable approach discussed in Section 2.4. The local average treatment effect estimates are presented in Table 3. In Panel A, we estimate equations 5 and 6 and in Panel B we estimate equation 7.

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| | Propensity to Donate | | Donation Amount | |
	(1)	(2)	(3)	(4)
Default Charity (No Choice)	0.007	0.01	0.006	-0.02
	(0.03)	(0.03)	(0.04)	(0.04)
Default Charity (No Choice) × Strong Value	.	-0.003	.	0.11
		(0.06)		(0.09)
Round 2 Only	0.01	-0.03	-0.07	-0.13**
	(0.04)	(0.05)	(0.05)	(0.06)
Round 2 Only × Strong Value	.	0.1	.	0.15
		(0.08)		(0.11)
Strong Value	.	0.08*	.	0.09
		(0.04)		(0.06)
Observations	1387	1387	1387	1387
R^2	0.0000681	0.009	0.001	0.02
Omitted Group		Default Cash		
Mean probability, Default Cash	.49	.46	.48	.45

OLS regression estimates. Robust standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Column (1) of Panel A indicates that giving in Round 1 causes a 40 percentage point (200% increase above the baseline) increase in the propensity to give in Round 2 (p-value=.071). In columns (3)&(4) the dependent variable is donation amount in Round 2. Column (3) indicates that giving in Round 1 causes subjects to increase their giving by $0.59 (200%) in Round 2 (p-value=.068). In sum, altruism begets altruism.

Result 4. *Consistent with Bénabou and Tirole (2011) and hypothesis 4, we find that subjects for whom altruism is a weakly-held value behave in a morally consistent manner.*

In columns (2) & (4), we investigate the differential response in Round 2 of subjects with strongly-held versus weakly-held values towards altruism. Panel A shows, consistent with Bénabou and Tirole (2011), that subjects for whom altruism is a weakly-held conviction respond in a confirmatory or morally consistent way in Round 2 to their nudge-induced behavior in Round 1.

Result 5. *Consistent with our model and hypothesis 5, we find that subjects for*

whom altruism is a weak facet of their identity are more *morally consistent in choosing whether to donate than those individuals for whom altruism is a strong facet of their identity. However, our data does not provide strong support in favor of weak altruists behaving more morally consistent in donation amounts than strong altruists.*

Our model of habit persistence generated a more stringent test of the identity-based heterogeneity and predicted that subjects for whom altruism is a weakly-held facet of identity would behave in a *more* morally consistent way than subjects for whom altruism is a strong facet of identity. Column (2) provides support for this hypothesis, but the estimate in column (4), though large in effect size, is not precisely measured and thus is somewhat weaker.

One potential concern is that an individual who has only given to charity once or twice in the past year, but gave a large sum of money, would be classified as having a weak identity towards altruism under our definition. To address this potential problem, in Table A2 in Appendix A, we show that subjects who have not given in the past year (i.e., weak identity) are significantly more morally consistent than subjects who have given 4 or more times in the past year (i.e., strong identity).

Immoral Consistency In Panel B, we estimate equation 7 to examine whether there is evidence of immoral consistency; that is, does keeping the cash in Round 1 cause an increase in keeping the cash in Round 2. We do not find evidence consistent with immoral consistency on the extensive margin (columns (1) & (2)), but columns (3)& (4) show that keeping the cash in Round 1 causes subjects to keep more cash in Round 2.

Result 6. *We find no evidence that subjects who have a strong identity towards altruism behave in a morally balanced manner when nudged towards selfishness.*

Columns (2) & (4) test for the second part of the Bénabou and Tirole (2011) hypothesis, which states that subjects who are nudged away from a strongly-held value will respond in a contradictory manner. Thus, we hypothesized that

subjects for whom altruism is a strongly-held value, but are nudged towards selfishness, would less selfish (or more altruistic) in Round 2. However, we do not find support for this hypothesis.

The results in Table 3 suggest that nudging virtuous behavior "today" may promote virtuous behavior "tomorrow", particularly among those individuals who have been less virtuous in the past. In other words, the nudge successfully crowds people into giving in Round 2, who would likely not have given in Round 2, by nudging them to give in Round 1.

3.4 Additional Findings: Multiple Donation Asks & Giving Behavior

In this section, we show that our nudge towards altruism, and moral consistency, in particular, helps to overcome decreases in giving that are typically associated with ask fatigue and multiple donation solicitations. Because we find that altruism begets altruism, this implies that giving in Round 1 begets more giving in Round 2. However, how do our treatment subjects compare to those subjects who are only asked to donate once? We make this comparison in Table 4, where the omitted group is the Control condition. Columns (1) and (2) show that subjects in the Default Charity and the Default Cash condition who are asked to give in Round 1 and Round 2, do not give significantly less in Round 2 than subjects in the Control condition, who are only asked to give in Round 2. Further, this equivalence in Round 2 giving, as seen in columns (3) and (4), means that total giving (the sum across Rounds 1 and 2) is greater for subjects in the Default Charity and Default Cash conditions than for subjects in the Control.

4 Conclusion

In this paper, we conducted a simple experiment to provide evidence that altruism begets altruism. We estimate a local average treatment effect, which

TABLE 3: LOCAL AVERAGE TREATMENT EFFECTS: ROUND 2 DONATION RATES & AMOUNTS

Panel A: Moral Consistency

	Propensity to Donate		Donation Amount	
	(1)	(2)	(3)	(4))
$\widehat{A_{i,1}}$	0.41* (0.23)	.	0.59* (0.32)	.
$\widehat{A_{i,1}} \times StrongValue$	.	-0.18 (0.39)	.	0.04 (0.53)
$\widehat{A_{i,1}} \times WeakValue$	.	0.83** (0.36)	.	0.95** (0.49)
Strong Value	.	0.36** (0.15)	.	0.37* (0.21)
Constant	0.25*** (0.06)	0.14* (0.08)	0.27*** (0.08)	0.15 (0.1)
Observations	415	415	415	415
R^2	0.2	0.03	0.21	0.12
χ^2 test				
$\widehat{A_i, 1} \times$ Strong $= \widehat{A_i, 1} \times$ Weak (p-value)		3.59 (.06)		1.58 (.21)

Panel B: Immoral Consistency	Propensity to Keep		Keep Amount	
	(1)	(2)	(3)	(4)
$\widehat{c_{i,1}}$	0.15 (0.16)	.	0.3* (0.16)	.
$\widehat{c_{i,1}} \times StrongValue$	.	0.17 (0.24)	.	0.02 (0.27)
$\widehat{c_{i,1}} \times WeakValue$	.	0.11 (0.23)	.	0.48** (0.24)
Strong Value	.	-0.09 (0.25)	.	0.27 (0.27)
Constant	0.78*** (0.12)	0.82*** (0.18)	0.57*** (0.12)	0.45** (0.19)
Observations	415	415	415	415
R^2	0.08	0.09	0.21	0.12
χ^2 test				
$\widehat{c_i, 1} \times$ Strong $= \widehat{c_i, 1} \times$ Weak (p-value)		.03 (.86)		1.58 (.21)

OLS regression estimates. Robust standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Donation Amount in Round 2		Total Donation Amount	
	(1)	(2)	(3)	(4)
Default Charity	0.07	0.12	0.59***	0.57***
	(0.07)	(0.08)	(0.1)	(0.11)
Default Cash	-0.04	-0.03	0.21**	0.2**
	(0.06)	(0.07)	(0.08)	(0.09)
Default Charity × Strong Value	.	-0.14	.	0.06
		(0.14)		(0.21)
Default Cash × Strong Value	.	-0.0006	.	0.08
		(0.14)		(0.18)
Strong Value	.	0.24***	.	0.24***
		(0.09)		(0.09)
Constant	0.41***	0.32***	0.41***	0.32***
	(0.04)	(0.05)	(0.04)	(0.05)
Observations	614	614	614	614
R^2	0.005	0.03	0.06	0.07

OLS regression estimates. Robust standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

is directly informed by our model of habit persistence. We go beyond showing that giving over time is positively correlated and instead show that an increase in altruistic behavior today *causes* an increase in altruistic behavior tomorrow and that this moral consistency in behavior is driven by subjects who can be classified as having a weak identity towards altruism.

We believe the findings in this paper generate interesting questions for future research. For example, one interesting question for future research may study whether different types of nudges or a longer length of time between asks result in similar patterns of moral consistency. We obtain exogenous variation in our Round 1 giving by using a default option nudge, but studying whether reminding individuals about social norms around giving, also a popular nudge, also generates moral consistency would be of great academic and practical interest.

If altruism begets altruism, then a nudge towards pro-sociality may provide previously unaccounted for benefits in various arenas, including governmental policy and corporate culture. For example, tax policies that provide subsidies

for individuals who give to charity may increase the direct amount of charitable giving (Gruber, 2004; Yörük, 2013), but also have the added benefit of increasing individuals' altruistic identities and thus leading to additional altruism. In an age when corporate culture, particularly that of the banking culture is highly scrutinized for its corruption and immorality (Cohn, Fehr, and Maréchal, 2014), a simple nudging of employees towards cooperative behavior may reorient the corporate culture towards inclusivity and pro-sociality. Of course, the lasting effects of such nudges remains an open question.

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Appendix A   Appendix

This section is meant for online publication only.

Thank you again for participating.

In addition to the participation payment of $1 that you will receive, you have also earned another $1.

The extra $1 will be added to your final payment, so you will receive a total of $2 which includes $1 for participating in this study plus this extra $1 bonus.

Your Extra Bonus Earnings: $1

(a) Round 1, Cash Endowment

Thank you again for participating.

In addition to the participation payment of $1 that you will receive, we will also make a donation on your behalf to a charity called CARE.

Your Donation Amount: $1.50

This $1.50 will be added to all of the donations of every participant to make a single payment to CARE. If you wish to receive confirmation of this donation, you will have the opportunity to indicate this in the survey at the end of the this study.

(b) Round 1, Charity Endowment

You now have the option to give away your extra $1 bonus. If you decide to give away your bonus, we will instead make a $1.50 donation to CARE on your behalf. In that case, you will have a $1 bonus from the participation fee and a $1.50 donation to CARE. We will add your **$1.50 donation to all of the donations of other participants to make a single payment to CARE. If you wish to receive confirmation of this donation, you will have the opportunity to indicate this at the end of this study.**

○ I do not want you to take $1 away from my bonus.

○ I want you to take away my entire $1 bonus in order to donate $1.50 to CARE.

(c) Swap Cash for Donation

You now have the option to take away your $1.50 donation to CARE. If you decide you do not want us to make a $1.50 donation to CARE on your behalf, we will instead add $1 to your bonus that you will get at the end of the survey. In that case, you will have a total of $2 for your bonus consisting of $1 of bonus for participation and $1 for this decision, and we will not many any donation to CARE on your behalf.

○ I do not want you to take away my $1.50 donation to CARE.

○ I want you to take away my entire $1.50 donation to CARE in order to add $1 to my bonus payment.

(d) Swap Donation for Cash

TABLE A1:   ROUND 2: MULTIPLE PRICE LIST FOR DONATION EXPERIMENT

Option 1:	Add $1.00 to your bonus and Donate $0 to Save the Children.
Option 2:	Add $.90 to your bonus and Donate $.20 to Save the Children.
Option 3:	Add $.80 to your bonus and Donate $.40 to Save the Children.
Option 4:	Add $.70 to your bonus and Donate $.60 to Save the Children.
Option 5:	Add $.60 to your bonus and Donate $.80 to Save the Children.
Option 6:	Add $.50 to your bonus and Donate $1.00 to Save the Children.
Option 7:	Add $.40 to your bonus and Donate $1.20 to Save the Children.
Option 8:	Add $.30 to your bonus and Donate $1.40 to Save the Children.
Option 9:	Add $.20 to your bonus and Donate $1.60 to Save the Children.
Option 10:	Add $.10 to your bonus and Donate $1.80 to Save the Children.
Option 11:	Add $0 to your bonus and Donate $2.00 to Save the Children.

Table A2: Local Average Treatment Effects: Round 2 Donation Rates & Amounts

Panel A: Moral Consistency	Propensity to Donate (1)	Donation Amount (2)
$\widehat{A_{i,1}} \times StrongValue$	-0.18 (0.39)	0.04 (0.53)
$\widehat{A_{i,1}} \times WeakValue$	1.17* (0.63)	1.50 (0.96)
Strong Value	0.42*** (0.15)	0.43* (0.22)
Constant	0.07 (0.08)	0.1 (0.12)
Observations	245	245
R^2	.	0.002
χ^2 test		
$\widehat{A_i,1} \times$ Strong $= \widehat{A_i,1} \times$ Weak	3.30*	1.75

Panel B: Immoral Consistency	Propensity to Keep (1)	Keep Amount (2)
$\widehat{c_{i,1}} \times StrongValue$	0.17 (0.24)	0.02 (0.27)
$\widehat{c_{i,1}} \times WeakValue$	0.46 (0.46)	0.75 (0.48)
Strong Value	0.23 (0.45)	0.52 (0.47)
Constant	0.51 (0.42)	0.2 (0.43)
Observations	245	245
R^2	0.03	0.002
χ^2 test		
$\widehat{c_i,1} \times$ Strong $= \widehat{c_i,1} \times$ Weak	.32	1.75

OLS regression estimates in which we have redefined a Weak Identity towards altruism as those subjects who report that they gave 0 donations in the past year. Robust standard errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.